INVENTION TITLE

Driving Safety Anti-Blind Proximity View e-Mirrors Having Owl's Eye Cameras

DESCRIPTION

[Para 1] **Field of the Invention.** This invention relates to form a practical driving safety view e-Mirror device to extent driver's vision to all existing blind sports and rear view etc. that can be potentially a new safety device after airbags.

[Para 2] The Different. The key revolutions to make this visual system different from any safety view camera devices, include : the owl's eye cameras with the gripper stand, small light enough and water proof, making possible to surface mount at good spots of a vehicle to obtain better proximity views, no more a single camera fixed at the straight back; the multiple stereo cameras, combining multiple LCD to obtain wide area panoramic view without using wide angle cameras that benefit to obtain large vision size matching to rear mirror reflective image size. Thus to eliminate the shrunk tiny image and lost proximity accuracy problem experienced in common wide angle single rear view camera device. What's more, using the left side, and right side blind spot view cameras, can totally remove the conventional side glass mirrors outside of the vehicle, result to reduce air drag 10 % and maximum 18% to those streamline low profile racing car. Thus fuel consumption can be reduced.

[Para 3] **Background of The Invention .** Countless traffic accidents happened in the past related to insufficient safety views: Backing up at blind rear views then ran over children ; Pull out from parking lot too quick and hit up coming vehicle or side walk people; Quick changing lanes on freeway made hit to a vehicle or motorcycle that came out from side blind spot somewhere suddenly; Tow truck sweep the trailer while changing lane and hit to a small vehicle at its side; Sharp braking on freeway to avoid something at front without seeing other vehicle following too close, then got hit etc. Because drivers " did not see it ! ".

Our existing reflective mirrors safety view system could not display dangerous dynamic vision to catch driver's attention. On the other hand, high cost mandatory airbags, nowadays are prior to any driving safety devices. However, airbags never deploy until deadly collision happened, and rescue injure and life lost after. No help to avoid collisions nor to reduce countless traffic accidents causing by driver's "did not see it !" error nationwide every month. It's time to make change and to upgrade the existing driving safety views system.

Problems of Driving Safety View in the Real World:

A. Existing safety view reflective glass mirrors in every motor vehicle, characterize narrow viewing angles, difficult to reflect both left and right side blind spots (see drawing 01);

B. No mirror is mounted in the back to see full rear view, unless using mirror in mirror, which will shrink the rear view to very small to see, or have to make a very large mirror to drag attention;

C. Mirrors are not able to reflect the proximity view of an approaching vehicle (or sidewalk people, or other objects) away from your vehicle;

D. Mirror can not be mounted more than 6 feet (the width of a vehicle) away from the driver, but only driver's front visible field, or image would be too small to view;

E. Glass mirrors are not flexible to mounts anywhere of the vehicle since it's heavy, large size.

[Para 4] Problems of Prior Arts of single safety view camera. What happen if you could only see with a single eye, rather than 2 eyes ? You would missed stereo, missed the depth of field that measure the proximity, missed half of the field and half of your viewing angle. You would be physically half blind vision. So do single cameras view system is so called half blind safety view system.

[Para 5] Problems of Prior Arts other safety view camera system. They legacy generic video cameras or low cost CMOS web cam are used. However, safety view video quality is so poor, blur, no dark or night visibility without disturbing LED lights. The most critical error is the shrunk tiny high distortion video image, totally mismatch to existing rear view glass mirrors. Drivers will be confused, can not estimate the object proximity accordingly. Small tiny video image can't catch driver's attention on it. Plus, camera over size, mount bracket design, and mount location to fit all type of motor vehicle, are still technical barriers, far not be able to resolve by using conventional optoelectronic products. These are some of reasons why, non of existing safety view devices come to a mature standard like airbag to be a legal device. Besides, contrast to many theoretical safety view prior arts, this article pin points detail solutions to manufacture a practical safety view device.

[Para 6] BRIEF DESCRIPTION OF THE DRAWINGS

01 The Optoelectronic Visual System.

02 The Owl's Eye Camera Assembly.

03 LCD Panels, Holders, and The Panoramic e-Mirror.

04 Micro Cameras Rear Diagonal Proximity Views Technique.

05 The Cost Effective Setting Pattern.

06 The Pro Setting Video Circuit Connection Pattern.

07 The Quad 2 x 2 LCD e-Mirrors and Setting.

What is claimed is:

[Claim 1] An optoelectronic visual system, for driving safety view, initial as the e-mirrors, comprising:

a plurality of LCD panels, featuring slim frame, ultra bright, sunlight viewable;

a plurality of holder stands, mounting said LCD panels on top of instrument panel of a vehicle;

a plurality of micro cameras, having ultra sensitive optoelectronic components inside, able to view day and night like owl's eyes, named as owl' eye cameras;

a plurality of O ring gripper stands, mounting said micro cameras on surface of the vehicle, near front corners and rear corners to obtain maximum proximity views;

a video circuit connection pattern, interconnecting said owl' eye cameras and said LCD panels using a plurality of detachable video cables.

[Claim 2] The optoelectronic visual system of claim 1, wherein said LCD panels having a particular height and width, 2 units of them side by side mounted together as dual screen, height and width closed match a typical central rear view glass mirror in a motor vehicle, so to have compatible view size.

[Claim 3] The optoelectronic visual system of claim 1, wherein said LCD panels, each of them comprise :

a high resolution TFT active matrix LCD glass, over 113 dpi dot per inch, comparing to 80 dpi regular LCD;

a super slim frame bezel;

a ultra bright back light, sunlight readable ;

a mirroring switch, to let a driver flip screen image left to right , right to left for flexible configuration;

an ambient light sensor;

an auto brightness circuit module controlled by said ambient light sensor, to turn brightness of said e mirrors dimmer at night time, brighter at daytime, so to maximize day and night visibility;

an auto contrast circuit module controlled by said ambient light sensor, to turn the contrast higher clear at night time, and lower at daytime, to prevent from white out effect causing by the sun UV ray.

[Claim 4] The optoelectronic visual system of claim 1, wherein said holder stands, mounting said LCD panels together as the e mirrors on dash, comprising:

a single width holder stand, having same width and same height dimension as the LCD panels, mounting one of the LCD panels on top left of a driving instrument panel to view driver's left blind spot;

another single width holder stand, same dimensions as the first one, mounting another one of said LCD panels on top right of a driving instrument panel to view driver's right blind spot;

a triple width holder stand, having triple width dimension of said LCD panels, mounting 3 of said LCD panels side by side horizontal together on front dash central top area, named the panoramic e-mirror, giving full 180 degree rear proximity view of the vehicle.

[Claim 5] The optoelectronic visual system of claim 1, wherein said owl's eye cameras having a fully detachable, interconnect open architectural assembly, comprising:

a micro front end module, as small as half of a thumb, merely 1 OZ super light weight making it possible to surface mount on near 4 corners area of the vehicle for proximity view, and having better stealth, unnoticeable effect ;

a micro back end module, to be mounted and hided inside the vehicle for security ;

a detachable flexible ribbon cable, connecting said micro front end module and said micro back end module together;

Whereby said micro front end module, a key visual component of the Owl's eye camera, has the smallest dimensions in the world among all water proof safety view precision cameras.

[Claim 6] The optoelectronic visual system in claim 5, wherein said micro front end module, comprises :

a cylinder micro water proof housing, as small as half a thumb size, having a front cylinder cover and back cylinder cover;

a UV filter glass disc, also as water proof shield, on said front cylinder cover;

a set of large iris micro lens, behind said UV filter glass disc, having twice size optical iris than regular camera lens;

a cylinder lens holder, inside central of said micro water proof housing;

an ultra sensitive CCD sensor, attached at back of said cylinder lens holder;

a socket connector at back of said ultra sensitive CCD sensor, for interconnecting to said rear module through said detachable flexible ribbon cable;

whereby to remove any unnecessary space in conventional cameras, and to make the owl's eye cameras having the most compact water proof optical module in the world.

[Claim 7] The optoelectronic visual system in claim 6, wherein said large iris micro lens, having twice size optical iris of regular camera lens, are ultra low optical distortion, to insure safety view accuracy, and high optical power for night vision, alike owls eyes.

[Claim 8] The optoelectronic visual system in claim 5, wherein said micro back end module, comprising :

a driving circuit PCB board module;

a digital signal processor DSP chip;

a set of functional switches, for image mirroring, shuttle speed, and gamma setting;

a socket connector for said detachable flexible ribbon cable interconnecting to said front end module;

an output sockets, for detachable connection to said long output cables.

[Claim 9] The optoelectronic visual system in claim 6, wherein said an ultra sensitive CCD sensor can view object under 0.3 lux candle light, 4 times sensitive than regular CCD chip, 7 times sensitive over CMOS chip, able to view traffic at suburb dark night without using LED lights that might bother other drivers.

[Claim 10] The optoelectronic visual system in claim 8, wherein said a digital signal processor DSP chip having advanced features, comprising:

ultra dynamic gamma processing, 5 times better clarity than regular cameras DSP when viewing dim object at high bright light spot , thereby to better view a following rear vehicle having head beam lights projecting on the owl's eye cameras;

ultra gamma video process combining auto high speed shuttle control from 1/60 to 1/10,000, thereby to view traffic clearly at ambient light change from 0.3 lux dark night up to 10,000 lux summer noon time under burning hot sun ultra UV ray without burning video effect nor white out screen effect ;

ultra high signal to noise 60db S/N ratio, 16 times better than common cameras using less than 48db DSP, having ultra low background noise and better vision definition while viewing traffic at dark night suburb.

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[Claim 11] The optoelectronic visual system of claim 1, wherein said a plurality of O ring gripper stands, using following techniques to make them ultra light for surface mount and fully flexible for tilting angle, comprise :

drawing 3 elements, a vertical rectangular, a horizontal rectangular, and a square;

dimensioning the length of vertical rectangular about 1.5 times surface circular length of the Owl's eye camera, the width of it about ¼ length of the Owl's eye camera, length and width of the horizontal rectangular about same dimensions as the vertical rectangular as the vertical rectangular, length of the square about double thumb nail size;

connecting, co-linear vertical edges of the 3 elements and in order, making the 3 elements to a pattern ;

cutting a thin, finger bendable soft stainless sheet metal shape as said pattern;

bending and forming the sheet metal to a O ring shape gripper at one end, diameter match the owl's eye cameras, a U shape at middle of said horizontal rectangular, a footpad shape at the square section for surface mount;

putting double sides sticky adhesive material or a Velcro on said footpad;

whereby surface mount of said a plurality of O gripper stands prevent drilling screw holes on the vehicle from hurting shiny surface, especially good for new luxury motor vehicles.

[Claim 12] The optoelectronic visual system of claim 1, wherein said a plurality of O ring gripper stands, mounting said owl's eye cameras at particular spots of the vehicle and particular pointing angles, comprise:

mounting 2 said owl's eye cameras using two O ring gripper stands on front left and front right of the vehicle near to the front signal lights;

tilting and stretching the O ring gripper stands to best point at the 2 side mounted owl's eye cameras toward the blind spots area and the proximity area of the vehicle on both the driver side and the passenger side symmetrically;

mounting 1 owl's eye camera at straight back and pointing it to get straight rear view;

mounting 2 owl's eye cameras near to rear signal lights of the vehicle in symmetrically;

pointing the owl's eye camera mounted from driver rear side toward opposite rear corner diagonally;

taking little edge view on the passenger side rear corner tip for its proximity view;

pointing the other owl's eye camera mounted from passenger rear side toward opposite rear corner diagonally;

taking little edge view on the driver side rear corner tip for its proximity view;

whereby to obtain all blind spots proximity view and full panoramic rear view.

[Claim 13] The optoelectronic visual system of claim 1, wherein said a video circuit connection pattern, linking all optoelectronic components together, forming a complete driving safety view system, comprise :

2 video circuit connections from the front left and right owl's eye cameras to the 2 LCD panels on top left

and top right of the driving instrument panel symmetrically with said detachable video cables ;

1 video circuit connection from the middle LCD panel of the panoramic e-mirror in claim 4 at central front dash;

1 video circuit diagonal connection, from the owl's eye camera mounted at driver's rear corner cross side to the right LCD panel of the panoramic e-mirror;

1 video circuit diagonal connection, from the owl's eye camera mounted at passenger's rear corner cross side to the left LCD panel of the panoramic e-mirror;

whereby to form a full mirrored 180 degree panoramic proximity rear view on the panoramic e-mirror, and to form left and right blind spots in the LCD panels on the top left and top right of the driving instrument panel.

[Claim 14] The optoelectronic visual system in claim 5, wherein said micro front end module and said back end module of the owl's eye camera, having security mount techniques, comprise:

mounting the front end module near to between a front signal light and a hood edge gap of the vehicle with the O ring gripper stand and double sides adhere;

opening the front hood of the vehicle, and placing the back end module of the owl's eye camera inside;

closing the hood and leaving the ribbon cable going through the hood edge gap and leaving the front end model exploded;

mounting front end module of the other owl's eye camera near to between a rear signal light and a back trunk, back door, or back window edge gap;

opening the back trunk or back door or back window of the vehicle, and hiding the back end module inside the vehicle;

closing the back trunk, back door, or back window and leaving the ribbon cable going through the edge gap with the front end model exploded.

[Claim 15] There are 3 setting techniques, cost effective setting, pro setting, large vehicle setting, to form multiple LCD and multiple micro cameras as powerful visual system for driving safety view, comprising steps of:

mounting 2 said micro cameras at left front, right front near to front turning signal lights of a vehicle, 2 other micro cameras at rear corners, 2 LCD on instrument top let and top right at front of a driver with a handy view switch, total 4 micro cameras and 2 LCD to form the cost effective setting;

mounting 1 more said micro cameras at central rear of the vehicle and pointing at straight back ,based on said cost effective setting, putting 3 LCD side by side together at central top of the front dash, connecting 3 of said micro cameras at rear to said 3 LCD side by side together at central top, total 5 micro cameras and 5 LCD to form the pro setting;

mounting 2 of the micro cameras at body middle spots of a large vehicle symmetrically, 2 other micro cameras at rear corners, mounting a large quad 2x2 LCD at central top of the front dash, connecting the all 4 micro cameras to the large quad 2X2 LCD to form the large vehicle setting.

[Claim 16] A quad 2X2 optoelectronic visual system, for large vehicles safety view, comprise :

a quad video digital LCD display, set on driver's front dash central top;

4 micro cameras, having ultra night vision like owl's eyes, named as owl' eye cameras;

4 O ring gripper stands, mounting said 2 micro cameras at middle of a large vehicle, and 2 at rear corners to obtain 2 x 2 blind spots views;

a quad video processor, able to input 4 channels video signal and to combine them as 2 x2 array single large screen;

an optional micro digital VCR to record all traffic safety views, working like a "black box" in commercial aircrafts, in case of accident happening;

4 optional GHz microwave wireless video transceivers for large towel truck or large trailer truck, using on wireless connection to said 4 micro cameras ;

an optional open architectural GPS system to share said quad video digital LCD display for high resolution GPS map navigation.

[Claim 17] The quad 2X2 optoelectronic visual system of claim 15, wherein said quad video processor, connected said 4 micro cameras, showing 2 middle blind sports views on top of said quad video digital LCD display, 2 rear view screens on bottom, integrates all 4 safety views on a central screen for driver's rapid view.

[Claim 18] The quad 2X2 optoelectronic visual system of claim 15, wherein said quad video processor, gives drivers one touch control to select zooming any 1 of 4 quarter size safety views in full screen.

ABSTRACT

[Para 7] An optoelectronic visual system comprises: multiple high resolution custom dimensions LCD; multiple ultra clarity night vision Owl' eyes CCD cameras integrated with micro water proof housings; multiple flexible surface mount camera gripper stands; techniques of cameras surface mount and LCD front dash mount to form the e-Mirrors. One key revolution this visual

system different from any safety view camera devices, is the water proof owl's eye cameras with the gripper stand, small and light enough for surface mount. Apply multiple of them at corners of vehicles to obtain large vision proximity views, match rear mirror reflective image size, instead of single wide angle camera fixed at the straight back. Whereby eliminate problem of shrunk tiny image and lost proximity accuracy. The visual system gives drivers multiple eyes viewing back and side, yet can remove the side mirrors, result to reduce air drag 10-18% thus save fuel. It raises new standard safety view for future generation motor vehicles. It cost less than airbag, moreover, driving safety plays more important role than airbags and more handy. Wish it reduce 1/3 traffic accidents each year and save our nation's billion dollars annual lost. Once it's value is discovered to public, it might be the next driving safety mandatory device after airbags!

DRAWINGS

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